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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/851,970 | 05/10/2001 | Seiji Umemoto | Q64435 | 4097 |

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SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
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EXAMINER

RUDE, TIMOTHY L

ART UNIT PAPER NUMBER

2871

DATE MAILED: 04/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,970

Applicant(s)

UMEMOTO ET AL.

Examiner

Timothy L Rude

Art Unit

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,4. 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: The recitation "a transparent layer lower in reflective index" is inconsistent with the Specification. For examination purposes the recitation will be interpreted as -- a transparent layer lower in refractive index --. Also, the recitation "said low-refractive-index transparent layer", although understandable, has no proper antecedent bases. Appropriate correction is required.

Double Patenting

2. Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of copending Application No. 09/898,060. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of copending Application No. 09/883,941. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of copending Application No. 09/878,268. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at

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shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-38 of copending Application No. 10/225,532. Although the conflicting claims are not identical, they are not patentably distinct from each other because the patentably distinct features pertain to the use of a transparent adhesive layer between a light guide or transparent substrate and a display panel that allows the light in said light guide or said transparent substrate to experience total internal reflection rather than passing into the display at shallow angles. Also, structures are used opposite said adhesive layer to direct light into the display at steep angles.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

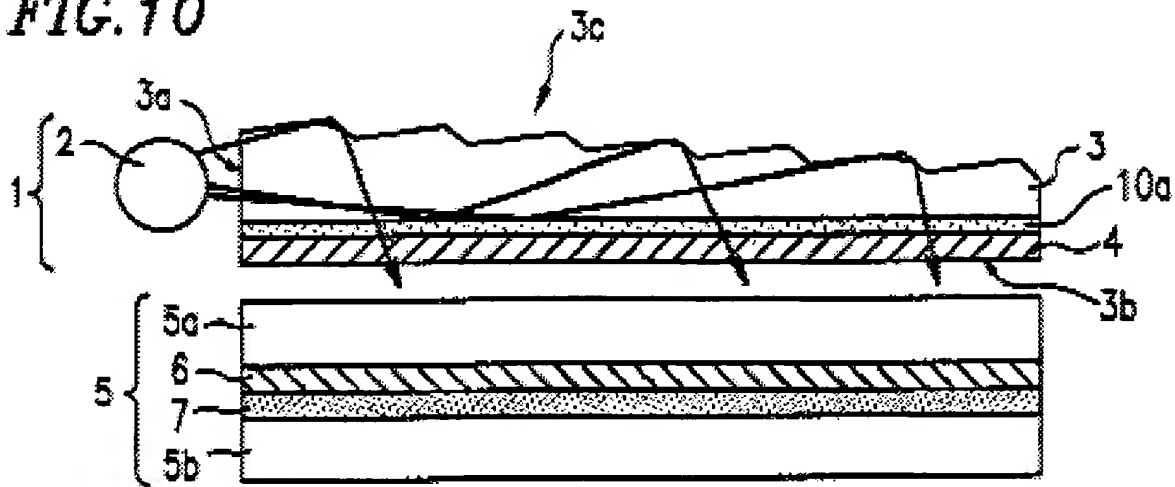
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda et al (Masuda) USPAT 6,340,999 B1.

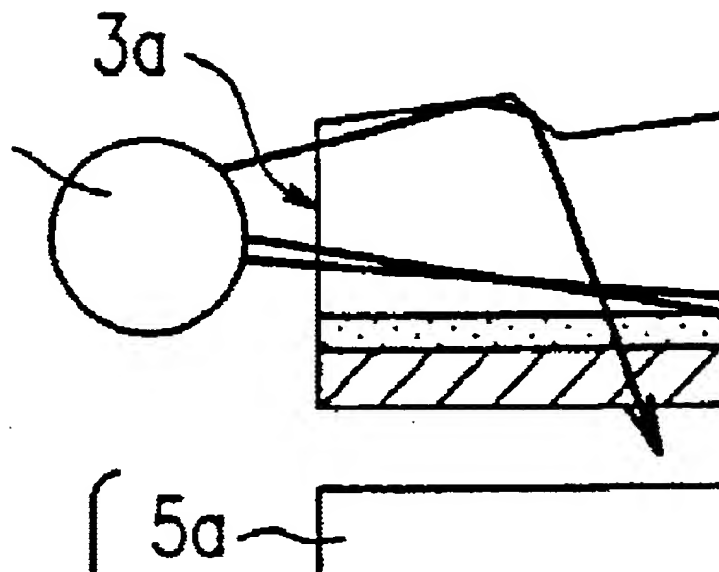
As to claim 1, Masuda discloses in Embodiment 3, Figure 10, (col. 15, line 25 through col. 18, line 16) a reflection type liquid-crystal display device comprising: a reflection type liquid-crystal display panel, 5, including a liquid-crystal cell and a reflector, 7, said liquid-crystal cell having a visual-side substrate, a back-side substrate, 5b, and a liquid crystal, 6, said visual-side substrate including a light guide, 3 (Applicant's transparent substrate), a low-refractive resin layer, 10a (Applicant's transparent layer), lower in reflective index (1.38, col. 15, lines 35-39) than the transparent substrate (1.49, col. 15, lines 35-39), and a transparent electrode (not shown), said back-side substrate having an electrode (not shown), said liquid crystal being held between said visual-side and back-side substrates so that respective electrode sides of said visual-side and back-side substrates are disposed opposite to each other, said reflector being disposed on the back-side substrate side (per Figure 10);

FIG. 10



at least one illuminator, 2, disposed on one of side surfaces of said reflection type liquid-crystal display panel; and

an optical path control layer having a repetitive structure of optical path changing slopes, 3c, on an outer side of said visual-side substrate and being higher in refractive index (1.49, col. 15, lines 35-39) than said low-refractive-index transparent layer, each of said optical path changing slopes being inclined at an inclination angle in a range of from 35 to 48 degrees with respect to a reference plane of said visual-side substrate as graphically illustrated by the light path arrow in the upper portion of Figure 10 below.



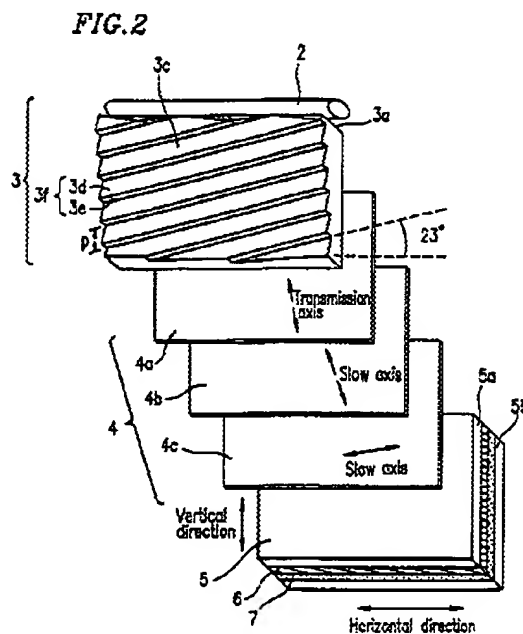
Masuda does not explicitly disclose and Applicant does not explicitly claim an optical path control layer having a repetitive structure of optical path changing slopes, on an outer side of said visual-side substrate that is not integral to the transparent substrate. However, making integral or making separable the parts of the visual-side substrate are species not considered patentably distinct. It would have been obvious to one having ordinary skill in the art at the time the invention was made to comprise the claimed structure of the visual-side substrate as an art-recognized species suitable for the intended purpose of forming a transparent substrate (MPEP 2144.07).

As to claim 2, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein said low-refractive-index transparent layer is disposed between said transparent substrate and said transparent electrode, and there is a

difference in refractive index by $(1.49-1.38) = 0.11$ (Applicant's 0.05 or more) between said transparent layer and said transparent substrate (col. 15, lines 35-39).

As to claim 3, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein at least said visual-side substrate in said liquid-crystal cell is made of polymethylmethacrylate (refractive index 1.49, col. 15, lines 35-39) (Applicant's optically isotropic material).

As to claim 4, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein said liquid-crystal display panel further includes one polarizer, 4a, disposed on one side of said liquid-crystal cell (col. 15, line 27-30).



As to claim 5, Masuda discloses a reflection type liquid-crystal display device according to claim 4, wherein said liquid-crystal display panel further includes at least one layer of phase retarder, 4c, disposed between said liquid-crystal cell and said polarizer.

As to claim 6, Masuda discloses a reflection type liquid-crystal display device according to claim 1, wherein: said optical path control layer is constituted by a repetitive structure of prism-like structures, 3f; and each of said optical path changing slopes in said optical path control layer faces said illuminator, 2 (see also Figure 10).

As to claim 7, Masuda discloses a reflection type liquid-crystal display device according to claim 6, wherein each of said prism-like structures in said optical path control layer is constituted by a concave portion shaped substantially like a triangle in section (Figure 10).

As to claim 8, Masuda discloses a reflection type liquid-crystal display device according to claim 7, wherein each of said prism-like concave portions is constituted by a continuous groove which extends from one end to the other end of said optical path control layer in a ridgeline direction parallel with or inclined to said side surface of said liquid-crystal display panel on which said illuminator is disposed (Figure 2).

As to claim 12, Masuda discloses a reflection type liquid-crystal display device according to claim 6, wherein each of said prism-like structures in said optical path control layer is constituted by a concave or convex portion shaped, in section, substantially like a triangle or quadrangle having at least two optical path changing slopes facing said illuminators (Figure 10).

As to claims 13 and 14, Masuda discloses a reflection type liquid-crystal display device according to claim 12 wherein said inclination angle of each of said optical path changing slopes in said optical path control layer is in a range of from 38 to 45 degrees, except wherein said illuminators are disposed on at least two of side surfaces of said liquid-crystal display panel.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to duplicate said illuminator so that illuminators are disposed on at least two of side surfaces of said liquid-crystal display panel since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

4. Claims 9-11 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda, as applied to claims 1 and 7 above, in view of Yano et al (Yano) Japanese Patent Abstract Publication 11-326903.

As to claims 9-11, Masuda discloses a reflection type liquid-crystal display device according to claim 7.

Masuda does not explicitly disclose a device wherein said prism-like concave portions are constituted by discontinuous grooves each having a length not smaller than 5 times as large as a depth of said groove.

Yano teaches that the grooves may be formed parallel to the light source and continuously or as a prism-like irregularity formed as a series of heights or crevices where the ridgeline continued and may be formed in the direction of a ridgeline which has a predetermined interval and was arranged discontinuously as intermittent heights or a crevice [0044] and Drawings 1-4.

Yano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add prism-like concave portions are constituted by discontinuous grooves each having a length not smaller than 5 times as large as a depth of said groove.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda with the prism-like concave portions are constituted by discontinuous grooves each having a length not smaller than 5 times as large as a depth of said groove of Yano since it has

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been held that discovering an optimum value of a results effective variable involves only routine skill in the art.

As to claims 15-17, Masuda discloses a reflection type liquid-crystal display device according to claim 1.

Masuda does not explicitly disclose a device wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low refractive index transparent layer, wherein said adhesive layer is constituted by a tacky layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive layer is higher by 0.05 or more than that of said low-refractive-index transparent layer.

Yano teaches the use of transparent glue (Applicant's tacky adhesive layer) having a refractive index of 1.40-1.55 which would result in the refractive index of said adhesive layer being higher by at least $(1.40 - 1.38) = 0.12$ (Applicant's 0.05 or more) than that of said low-refractive-index transparent layer to provide a bright display with only low-power light [0053].

Yano is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use a device wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low refractive index transparent layer, wherein said adhesive layer is constituted by a tacky

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layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive laver is higher by 0.05 or more than that of said low-refractive-index transparent layer to provide a bright display with only low-power light.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda wherein said optical path control layer is made of a transparent sheet, and is bonded to said liquid-crystal display panel through an adhesive layer having a refractive index higher than that of said low refractive index transparent layer, wherein said adhesive layer is constituted by a tacky layer, and wherein each of the refractive index of said optical path control layer and the refractive index of said adhesive laver is higher by 0.05 or more than that of said low-refractive-index transparent layer of Yano to provide a bright display with only low-power light.

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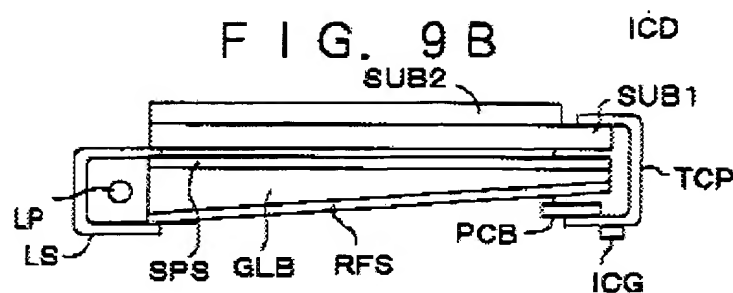
5. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masuda, as applied to claim 1 above, in view of Nemoto et al (Nemoto) USPAT 6,456,344 B1.

As to claims 18 and 19,

As to claim 18, Masuda discloses a reflection type liquid-crystal display device according to claim 1.

Masuda does not explicitly disclose a device wherein: at least one side surface of said visual-side substrate is protruded outward from that of said back-side substrate; and each illuminator is disposed on said protruded side surface of said visual-side substrate, and wherein each illuminator is disposed and held on said side surface of said visual-side substrate in such a manner that said illuminator is enclosed by a reflection type light source holder and end portions of said light source holder are bonded to end portions of upper and lower surfaces of said visual-side substrate.

Nemoto teaches in Figure 9B the use of a protruded side surface with a light source holder, LS, bonded to end portions of upper and lower surfaces of transparent substrate, GLB, to comprise a lighted display assembly (col. 7, lines 27-32).



Nemoto is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add at least one side surface of said visual-side substrate is protruded outward from that of said back-side substrate; and each illuminator is disposed on said protruded side surface of said visual-side substrate, and wherein each illuminator is disposed and held on said side surface of said visual-side substrate in such a manner that said illuminator is enclosed by a reflection type light source holder and end portions of said light source holder are bonded to end portions of upper and lower surfaces of said visual-side substrate to comprise a lighted display.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Masuda with the at least one side surface of said visual-side substrate is protruded outward from that of said back-side substrate; and each illuminator is disposed on said protruded side surface of said visual-side substrate, and wherein each illuminator is disposed and held on said side surface of said visual-side substrate in such a manner that said illuminator is enclosed by a reflection type light source holder and end portions of said light source holder are bonded to end portions of upper and lower surfaces of said visual-side

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substrate as an art-recognized means suitable for the intended purpose of comprising a lighted display (MPEP 21.07).

References cited but not applied are relevant to the instant Application.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (703) 305-0418. The examiner can normally be reached on Monday through Thursday.

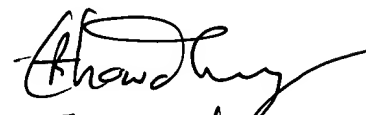
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on (703) 305-3492. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.



Timothy L Rude
Examiner
Art Unit 2871

TLR
April 7, 2003



T. Choudhury
Primary Examiner